

Notice No.4

Rules and Regulations for the Classification of Special Service Craft July 2017

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: December 2017

Amendments to	Effective date	IACs/IMO implementation (if applicable)
Part 3, Chapter 1, Section 5	1 January 2018	N/A
Part 6, Chapter 2, Section 2, 3, 4	1 January 2018	N/A
Part 6, Chapter 5, Section 2	1 January 2018	N/A
Part 7, Chapter 2, Section 4	1 January 2018	N/A
Part 7, Chapter 5, Section 2	1 January 2018	N/A
Part 8, Chapter 5, Section 2	1 January 2018	N/A
Part 8, Chapter 7, Section 3	1 January 2018	N/A

Part 3, Chapter 1

General Regulations

■ Section 5

Information required

5.2 Submission of plans and data

(Part only shown)

5.2.2 Where an ***IWS** (In-water In-Water Survey) notation is to be assigned, see *Pt 1, Ch 2, 3.8 Other hull notations 3.8.2*, plans and information covering the following items are to be submitted:

Part 6, Chapter 2 Construction Procedures

■ Section 2 Materials

2.9 External immersed areas

2.9.1 For the deferment of dry-docking or where an **IWS** (In-water **In-Water** Survey) notation is to be assigned protection of the underwater portion of the hull is to be provided by means of a suitable high resistance paint applied in accordance with the manufacturer's requirements. Details of the high resistance paint are to be submitted for information.

■ Section 3 Procedures for welded construction

3.5 Inspection and non-destructive examination

3.5.3 Typical locations for volumetric examination and number of checkpoints to be taken are shown in **Pt 6, Ch 2, 3.5 Inspection and non-destructive examination 3.5.3 Table 2.3.1 Non-destructive examinations of welds**. A list of the proposed items to be examined is to be submitted for approval.

3.5.4 Alternative proposals to **Table 2.3.1 Non-destructive examination of welds** will be considered on a case by case basis for example, implementing a statistical approach based on historical data and current trends, or implementing an enhanced quality assurance process scheme.

Table 2.3.1 Non-destructive examinations of welds

Volumetric non-destructive examinations - Recommended extent of testing, see Pt 6, Ch 2, 3.5 Inspection and non-destructive examination 3.5.3		
Item	Location	Checkpoints, see Notes 1, 2 and 4 (these are common to all listed item locations)
Intersections of butt and seams of fabrication and section welds	Throughout: - hull envelope - longitudinal and transverse bulkheads - inner bottom and hopper bottom	The summation of checkpoint lengths, see Note 2, examined at intersections is to be L, where L is the overall length of the ship in metres Checkpoints shall be taken at these locations; the summation of checkpoint lengths examined at intersections is to be $0,2L$, where L is the overall length of the ship in metres.
Butt welds in plating	Throughout	1 m in 25 m 100 m, see Note 3
Seam welds in plating	Throughout	1 m in 100 200 m, see Note 3
Butts in longitudinals	Hull envelope within $0,4L$ amidships Hull envelope outside $0,4L$ amidships	1 in 10 40 welds 1 in 20 30 welds
Bilge keel butts	Throughout	1 in 10 40 welds
Structural items when made with full penetration welding as follows: - connection of stool and bulkhead to lower stool shelf plating - vertical corrugations to an inner bottom - hopper knuckles - sheerstrake to deck stringer - hatchways coaming to deck	Throughout	1 m in 20 60 m

Note 1. The length of each checkpoint is to be between 0,3 m and 0,5 m, where the length of weld permits.

Note 2. For checkpoints at intersections the measured dimension of length is to be in the direction of the butt weld. See **Figure 2.3.1 Inspection of checkpoints located on longitudinal stiffeners to Figure 2.3.3 Checkpoint positions in way of radiography and ultrasonic inspection on deck plating**.

Note 3. Checkpoints in butt welds and seam welds are in addition to those at intersections.

Note 4. The Agreed NDE checkpoint locations are not to be indicated on the blocks prior to the welding taking place, nor is any special treatment to be given at these locations.

Note 5. Particular attention is to be given to repair rates in longitudinal butts. Additional welds are to be tested in the event that defects, such as lack of fusion or incomplete penetrations, are repeatedly observed.

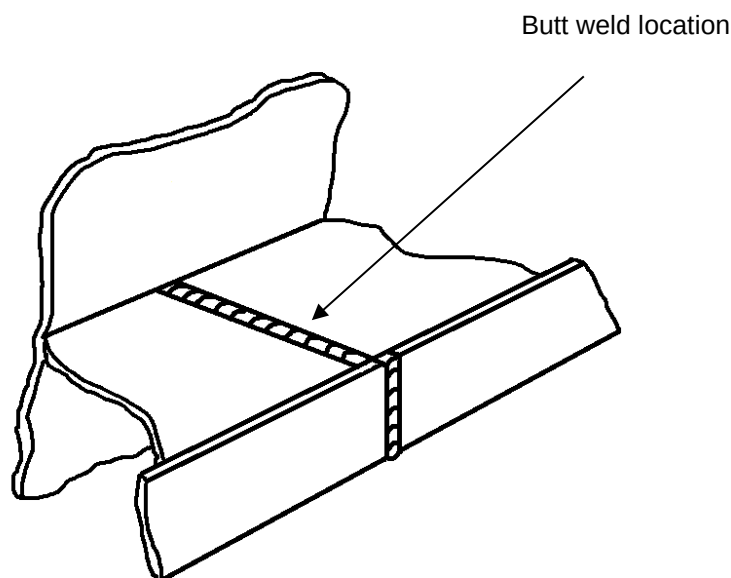
3.5.5 Any checkpoint which contains a rejectable weld discontinuity shall be repaired, as appropriate, and retested. Furthermore, volumetric NDE shall be increased by an additional one checkpoint for each checkpoint failure, to be chosen at random by the Surveyor. This additional checkpoint is supplementary to the repaired/retested location.

3.5.6 Systematic defects or repetitive defects shall be investigated, rectified, and retested where appropriate. The extent of NDE checkpoints shall be increased in way of the areas, weld types or intersections, where the systematic or repeated defects are observed, by an additional 50 per cent of the affected item (listed in Item column of *Table 2.3.1 Non-destructive examinations of welds*), to determine the weld quality.

3.5.7 If there is evidence to suggest the overall welding quality is not of a satisfactory nature, then a further NDE checkpoint regime, and enhanced quality assurance process, shall be applied. The fabricator shall present to the Surveyor the additional measures and regime to be implemented.

3.5.8 If cracks of any type or size are detected, then *Pt 6, Ch 2, 3.5 Inspection and non-destructive examination 3.5.5* and *Pt 6, Ch 2, 3.5 Inspection and non-destructive examination 3.5.6* shall apply.

3.5.9 Isolated gas pores, slag inclusions, or metallic inclusions shall not be considered as systematic defects, however, they must be assessed individually with respect to the applicable acceptance criteria within LR Rules, and *Pt 6, Ch 2, 3.5 Inspection and non-destructive examination 3.5.5* shall apply. All other defect types when repeatedly observed shall be considered as systematic defects, and *Pt 6, Ch 2, 3.5 Inspection and non-destructive examination 3.5.6* shall apply.



The length of butt welds located at checkpoints on longitudinal stiffeners may be less than 300 mm for radiography or 500 mm for ultrasonic inspection. In such cases inspect as much of the welds as access permits.

Figure 2.3.1 Inspection of checkpoints located on longitudinal stiffeners

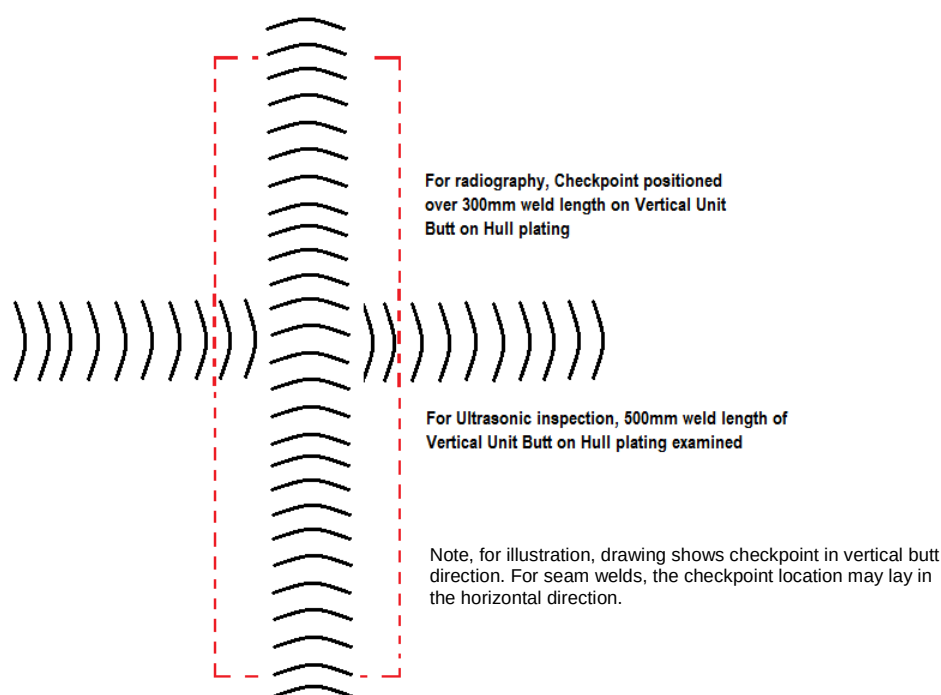


Figure 2.3.2 Checkpoint positions in way of radiography and ultrasonic inspection on hull plating

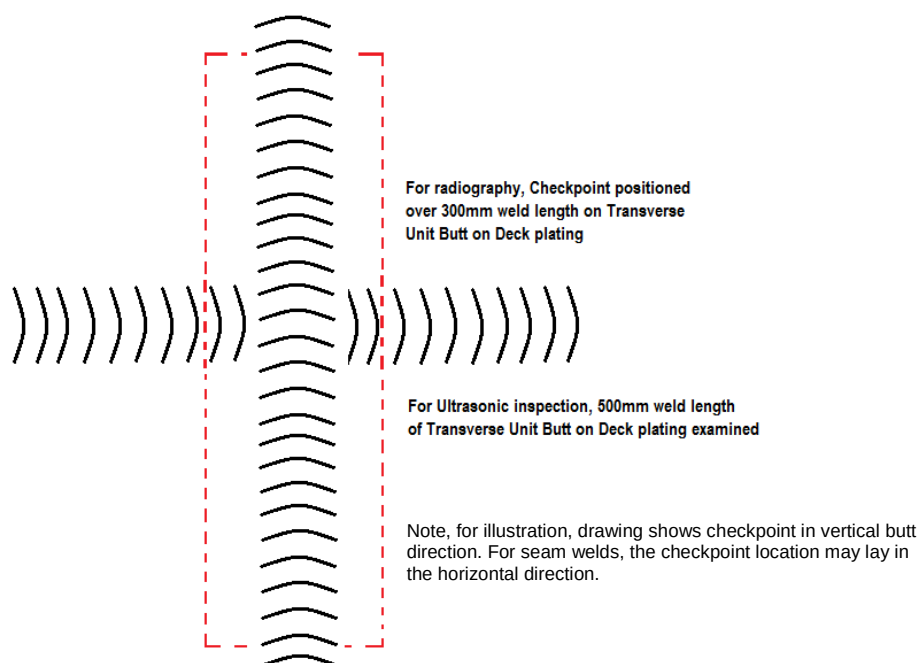


Figure 2.3.3 Checkpoint positions in way of radiography and ultrasonic inspection on deck plating

3.6 Acceptance criteria

3.6.1 All finished welds are to be sound and free from cracks and substantially free from lack of fusion, incomplete penetration, porosity and tungsten inclusions. The surfaces of all finished welds are to be reasonably smooth and substantially free from undercut and overlap. Care is to be taken to ensure that the specified dimensions of welds have been achieved and that both excessive reinforcement and underfill of welds are avoided.

3.6.2 The acceptance criteria are to be in accordance with the appropriate Tables contained within *Ch 13, 2 Specific requirements for ship hull structure and machinery* of the *Rules for Materials* *Rules for the Manufacture, Testing and Certification of Materials*, July 2017.

■ Section 4 Joints and connections

4.5 Fillet welds

4.5.1 The throat thickness of fillet welds is to be not less than:

$$\text{Throat thickness} = t_p \cdot \text{weld factor} \times \left(\frac{d}{s}\right) \text{ mm}$$

where

- s = the length, in mm, of the fillet that is fully formed and weld clear of any end dressing, as illustrated in *Figure 2.4.1 Weld dimensions and types*. ~~10 × plate thickness or 40 mm, whichever is the greater, but need not exceed 75 mm.~~
- d = the distance between successive weld fillets, in mm
- t_p = plate thickness, in mm, on which weld fillet size is based, see *Pt 7, Ch 2, 4.5 Fillet welds 4.5.4*.

For weld fillet dimensions, see *Figure 2.4.1 Weld dimensions and types*. Weld factors are contained in *Table 2.4.3 Weld factors*.

4.5.2 The length, in mm, of any weld fillet in any intermittent welding arrangement is to be at least $10t_p$ or 40 mm, whichever is the greater but need not exceed 75 mm.

Existing paragraphs 4.5.2, 4.5.3 and 4.5.4 have been renumbered 4.5.3, 4.5.4 and 4.5.5.

Part 6, Chapter 5 Special Features

■ Section 2 Special features

2.6 ~~Crane~~ Lifting appliance support arrangements

2.6.4 The limiting stress coefficients for lifting appliance pedestals and foundation structural elements are given in *Pt 6, Ch 7, Table 7.3.1 Limiting stress coefficient for local loading*.

2.6.5 The deck plating and underdeck stiffening in way of a lifting appliance pedestal are to be assessed using the same criteria used to assess the lifting appliance pedestal.

~~2.6.4~~ 2.6.6 When submitting plans for the proposed foundation, the designer is include design calculations covering the parameters indicated in *Pt 6, Ch 5, 2.6 ~~Crane~~ Lifting appliance support arrangements 2.6.2* and *Pt 6, Ch 5, 2.6 Lifting appliance support arrangements 2.6.4*

Existing paragraphs 2.6.5 to 2.6.7 have been renumbered 2.6.7 to 2.6.9.

Part 7, Chapter 2 Construction Procedures

■ Section 4 Joints and connections

4.5 Fillet welds

4.5.1 The throat thickness of fillet welds is to be not less than:

$$\text{Throat thickness} = t_p \cdot \text{weld factor} \times \left(\frac{d}{s}\right) \text{ mm}$$

where

- s = the length, in mm, of the fillet that is fully formed and weld clear of any end dressing, as illustrated in *Figure 2.4.1 Weld dimensions and types* but for the purposes of this calculation need not exceed 75 mm ~~10 × plate thickness or 40 mm, whichever is the greater, but need not exceed 75 mm.~~
- d = the distance between successive weld fillets, in mm
- t_p = plate thickness, in mm, on which weld fillet size is based, see *Pt 7, Ch 2, 4.5 Fillet welds 4.5.4*.

For weld fillet dimensions, see *Figure 2.4.1 Weld dimensions and types*.

Weld factors are contained in *Table 2.4.3 Weld factors*.

4.5.2 The length, in mm, of any weld fillet in any intermittent welding arrangement is to be at least $10t_p$ or 40 mm, whichever is the greater, but need not exceed 75 mm.

Existing paragraphs 4.5.2, 4.5.3 and 4.5.4 have been renumbered 4.5.3, 4.5.4 and 4.5.5.

4.8 Double continuous fillet welding

4.8.3 In the impact area, for welding arrangements where $t_p \leq 8\text{mm}$ and the requirements of *Pt 7, Ch 2, 4.5 Fillet welds* (considering $\frac{d}{s} = 1$) and *Pt 7, Ch 2, 4.6 Throat thickness limits* are complied with, it is permitted to reduce the length of the weld to not less than 80 per cent of the total length of a theoretical double continuous weld joining the elements in the arrangement. Welding is to be by an intermittent staggered arrangement, see *Figure 2.4.3 Intermittent staggered welding*. This requirement does not supersede others relating to end connections.

Existing paragraph 4.8.3 has been renumbered 4.8.4.

4.8.4 4.8.5 Double continuous fillet welding is to be adopted in the following locations and may be used elsewhere if desired:

- (a) Boundaries of weathertight decks and erections, including hatch coamings, companionways and other openings.
- (b) Boundaries of tanks and watertight compartments or in spaces or locations where condensation, spray or leakage water can accumulate.
- (c) Main engine seatings.
- (d) Bottom framing structure in way of machinery and jet room spaces of high speed craft as appropriate.
- (e) The side and bottom shell structure in the impact area of high speed craft (*see Pt 7, Ch 2, 4.8 Double continuous fillet welding 4.8.3*).
- (f) The underside of the cross-deck structure in the impact area of high speed multi-hull craft.
- (g) Structure in way of ride control systems, stabilisers, foils, lifting devices, thrusters, bilge keels, foundations and other areas subject to high stresses.
- (h) The shell structure in the vicinity of the propeller blades.
- (i) Stiffening members to plating in way of end connections, scallops and of end brackets to plating in the case of lap connections.
- (j) Primary and secondary members to plating in way of end connections, and end brackets to plating in the case of lap connections.
- (k) Face flats to webs of built-up/fabricated stiffening members in way of knees/end brackets and for a distance beyond such knees/end brackets of not less than the web depth of stiffener in way.



Figure 2.4.3 Overlapping intermittent staggered welding

Existing paragraph 4.8.5 has been renumbered 4.8.6.

Part 7, Chapter 5 Special Features

■ Section 2 Special features

2.6 ~~Crane~~ Lifting appliance support arrangements

2.6.4 The limiting stress coefficients for lifting appliance pedestals and foundation structural elements are given in *Pt 7, Ch 7, Table 7.3.1 Limiting stress coefficient for local loading*.

2.6.5 The deck plating and underdeck stiffening in way of a lifting appliance pedestal are to be assessed using the same criteria used to assess the lifting appliance pedestal.

~~2.6.4~~ 2.6.6 When submitting plans for the proposed foundation, the designer is include design calculations covering the parameters indicated in *Pt 7, Ch 5, 2.6 ~~Crane~~ Lifting appliance support arrangements 2.6.2* and *Pt 7, Ch 5, 2.6 Lifting appliance support arrangements 2.6.4*

Existing paragraphs 2.6.5 to 2.6.7 have been renumbered 2.6.7 to 2.6.9.

Part 8, Chapter 5

Special Features

■ Section 2

Special features

2.6 Crane Lifting appliance support arrangements

2.6.4 The deck plating and underdeck stiffening in way of a lifting appliance pedestal are to be assessed using the same criteria used to assess the lifting appliance pedestal.

2.6.5 The support arrangements for life-saving appliances are in general, to be in accordance with *Pt 3, Ch 9, 6.5 Support structure for life-saving appliances of the Rules and Regulations for the Classification of Ships, July 2017*.

2.6.6 The strength of composite lifting appliance pedestals (all failure modes) is to be assessed based on the ultimate tensile strength of the material using the limiting stress criteria given in *Pt 8, Ch 7, Table 7.3.1 Limiting stress criteria for local loading*.

~~2.6.4 When submitting plans for the proposed foundation, the designer is to include design calculations covering the parameters indicated in *Pt 8, Ch 5, 2.6 Crane support arrangements 2.6.2*~~

2.6.7 Direct FE calculations of the lifting appliance or life-saving appliance foundation, carried out in accordance with the requirements of *Pt 3, Ch 1, 2 Direct calculations*, are to be submitted for review. Calculations are to be based on ply theories or recognised multiaxial failure criteria. Details of the reporting and acceptance criteria are to be agreed beforehand. Alternatively, a full scale load test using the SWL (calculated in accordance with *Pt 8, Ch 5, 2.6 Lifting appliance support arrangements 2.6.2* or *Pt 8, Ch 5, 2.6 Lifting appliance support arrangements 2.6.5* as appropriate) divided by the limiting stress coefficient given in *Pt 8, Ch 5, 2.6 Lifting appliance support arrangements 2.6.6* is to be carried out. Details are to be agreed with LR prior to testing.

~~2.6.5~~ 2.6.8 The deck laminate is to be additionally reinforced in way of crane lifting appliance foundations. The thickness of reinforcement is to be that required by the designer's calculations but in no case less than 50 per cent of the thickness of the adjacent plating.

~~2.6.6~~ 2.6.9 Laminate tapers are to be in accordance with *Pt 8, Ch 2, 3.9 Laminate detail*.

~~2.6.7 The support arrangements for life saving appliance davits and cranes, are in general, to be in accordance with *Pt 3, Ch 9, 6.5 Support structure for life-saving appliances of the Rules and Regulations for the Classification of Ships, July 2016, incorporating Notice No. 1,2,3,4 & 5*.~~

Part 8, Chapter 7 Failure Modes Control

■ Section 3 Stress control

3.5 Core shear stress

(Part only shown)

Table 7.3.1 Limiting stress criteria for local loading

Helicopter/flight decks:			
(a) Normal usage:			
• laminate	0,25	0,25	-
• secondary stiffening	0,33	0,33	0,33
• primary stiffening	0,33	0,33	0,33
(b) Emergency landing:			
• laminate	0,33	0,33	-
• secondary stiffening	0,43	0,43	0,43
• primary stiffening	0,43	0,43	0,43
Lifting appliance pedestal/foundation structural elements:			
(a) cargo cranes	0,25	0,25	0,25
(b) structures exposed to permanent static loads	0,22	0,22	0,22
(c) LSA davit foundations, see also Pt 8, Ch 5, 2.6 Lifting appliance support arrangements 2.6.5	0,22	0,22	0,22

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